

APPENDIX Q

PROCEDURES FOR ENVIRONMENTAL MONITORING AND ANALYSIS

ENVIRONMENTAL SAMPLING CORPORATION

Dedicated to Environmental Monitoring, Science & Technology

Sampling Plan

Advanced Disposal Services - Glacier Ridge Landfill
WDNR License Number 03068

Prepared for Advanced Disposal Services - Glacier Ridge Landfill, LLC

August 2018

**Advanced Disposal Services - Glacier Ridge Landfill
WDNR License Number 03068**

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1. Advanced Disposal Services - Glacier Ridge Landfill Sampling Schedule and Map
2. ESC Field Information Form
3. ESC Gas Monitoring Field Information Form

**Environmental Sampling Corporation
Sampling Plan**

**Advanced Disposal Services - Glacier Ridge Landfill
WDNR License Number 03068**

1.0 Overview

The facility is located in the W ½ of Section 35, Township 12-North, Range 16-East, Town of Williamstown and the NW ¼ of Section 2, Township 11 North, Range 16 East, Town of Hubbard, Dodge County, Wisconsin.

The facility's proposed monitoring program currently includes groundwater monitoring wells, water supply wells, gradient control/underdrain system discharge, surface water staff gauges, leachate monitoring points, leachate head wells, leachate tank interstitial space sump, gas condensate dripleg, gas blower and lysimeters. The proposed monitoring frequency and parameter lists for each monitoring point are included in Attachment 1. Monitoring locations, frequencies, and parameter lists are subject to change.

A map showing the monitoring point locations is also included in Attachment 1.

2.0 Sampling Plan Summary

The Sampling Plan for the Advanced Disposal Services - Glacier Ridge Landfill outlines the approach to be followed to collect representative groundwater samples from the monitoring well network at the facility, and to comply with regulatory requirements established in NR 507.16, Wis. Adm. Code. Procedures for collecting, preserving, and handling samples from each of the monitoring points are discussed in the following sections.

The sampling plan indicates the following procedures and techniques:

- Field Measurements
- Purging Procedures
- Sampling Procedures
- Sample Shipment
- QA/QC Sampling Procedures
- Chain-of-Custody

3.0 Field Measurements

3.1 Water Levels

Water levels are measured at site groundwater monitoring wells prior to conducting purging or sampling activities. All groundwater elevations should be measured within a 24-hour period to avoid temporary variations in groundwater levels that could preclude making an accurate determination of groundwater flow rate and direction. The water level indicator should be a portable electronic device or equivalent, which signals by audio or light signal when the probe contacts the water. ESC typically uses a Heron electronic water tape. The water level measurement is recorded to the nearest 0.01 foot. The water level measurement, top-of-casing elevation, total depth, and groundwater elevation are recorded on the ESC Field Information Form (Attachment 2). The depth to water level indicator is decontaminated between wells using deionized water.

3.2 Field Parameters

Temperature, specific conductance, and pH are measured at monitoring wells following purging, prior to sampling activities. Temperature is measured using an electronic device accurate to $\pm 0.5^{\circ}$ C. Specific conductance is measured using a meter with automatic temperature correction and a range of approximately 0 to 50,000 μ mhos. pH is measured using an electronic device accurate to ± 0.01 standard pH units (SU). ESC typically uses a waterproof Cole Parmer PC100 dual pH/conductivity meter. Meters are decontaminated using deionized water between wells. Instruments are properly calibrated and checked with standards according to the manufacturer's specifications on a daily basis. Any instrument malfunctions are noted. Improperly operating instruments are repaired or replaced prior to continuing sampling operations.

Turbidity and color are visually described both before and after filtering, if applicable. Unusual odors are noted. Information is recorded on the ESC Field Information Form.

4.0 Purging Procedures

4.1 Monitoring Well Purging Procedures

Upon arrival at the well location, the condition of the well is observed and documented on the ESC Field Information Form. Information to be noted includes the following:

- Condition of the well's identification sign
- Appearance of the well
- Condition of the lock
- Well integrity, including: condition of the well, protective casing, and surface seal
- Any physical problems, including: obstructions or kinks in the casing, and water in the annulus
- Weather conditions (i.e., wind speed and direction, temperature, overview, and documentation of any physical activities upwind of the sampling location)
- Evidence of any surface contamination

The static groundwater depth is measured as described previously, prior to the start of purging activities. The monitoring well purging system to be used consists of dedicated bladder pumps or dedicated bailers. The monitoring well is purged to dryness or until the equivalent of four standing-water volumes (measured from the depth to water to the bottom of the well) is removed from the well prior to sampling. This procedure insures that samples are drawn from the aquifer, not from stagnant water left in the well between sampling events. If a monitoring well does not recharge sufficiently to allow sampling within a reasonable time period (48 hours), the well is considered "dry" for the sampling event. All results of the purging operation are documented on the ESC Field Information Form.

Wells are sampled immediately upon completion of purging activities. If additional time is necessary for wells to recharge to provide a sufficient volume of water required for analysis, this is documented on the ESC Field Information Form.

4.2 Lysimeter Purging Procedures

The static groundwater depth is measured as described previously, prior to the start of purging activities. The lysimeter purging system consists of dedicated polypropylene tubing and portable electric submersible pumps. The lysimeter is purged to dryness or until the equivalent of four standing-water volumes is removed from the well prior to sampling. The standing water volume will be estimated including the volume in both the vertical and horizontal portions of the well casing. If a lysimeter does not recharge sufficiently to allow sampling within a reasonable time period (48 hours), it is considered “dry” for the sampling event. All results of the purging operation are documented on the ESC Field Information Form.

5.0 Sample Collection

5.1 Monitoring Well Sample Collection

The monitoring well sampling system at the site consists of dedicated bladder pumps or dedicated bailers. Groundwater samples are collected starting with upgradient wells and continuing progressively downgradient. Data from the previous round of groundwater level measurements are used to evaluate the direction of groundwater flow. In addition, due to the existing groundwater contamination from the LGRL superfund site, sampling is conducted starting at the wells with the least evidence of contamination and progress to those exhibiting progressively more evidence of contamination.

Samples are collected at the lowest flow possible in order to provide high-quality, representative, and consistent data. Samples are placed in new pre-preserved containers provided by the laboratory. Except for VOC samples, groundwater samples are positive pressure field-filtered using a 45-micron filter. A new filter is used at each sampling point.

A separate container is filled for the temperature, pH, specific conductance, and other field parameters. These field parameters are measured as described previously. All results are documented on the ESC Field Information Form.

5.2 Water Supply Well Sample Collection

The water supply well sampling procedures will consist of purging the well using the homes plumbing system for at least 15 minutes at a location closest to the well before the water has been treated (ie. water softener, iron curtain, etc.), which in most cases is the spigot located on the pressure tank. Samples are collected at the lowest flow possible in order to provide high-quality, representative, and consistent data. Samples are placed in new pre-preserved containers provided by the laboratory. Water supply well samples are not filtered.

A separate container is filled for the temperature, pH, specific conductance, and other field parameters. These field parameters are measured as described previously. All results are documented on the ESC Field Information Form.

5.3 Gradient Control/Underdrain System Discharge Sample Collection

The gradient control/underdrain system discharge sampling consists of a Teflon dipper. Samples are collected from the discharge piping at the lowest flow possible in order to provide high-quality, representative, and consistent data. Samples are placed in new pre-preserved containers provided by the laboratory. Gradient control/underdrain system discharge samples are not filtered.

A separate container is filled for the temperature, pH, specific conductance, and other field parameters. The color, turbidity and odor of the sample are noted. All results are documented on the ESC Field Information Form.

5.4 Lysimeter Sample Collection

The lysimeter sampling system used consists of dedicated polypropylene tubing and portable electric submersible pumps. Samples are collected at the lowest flow possible in order to provide high-quality, representative, and consistent data. Samples are placed in new pre-preserved containers provided by the laboratory. Lysimeter samples are not filtered.

A separate container is filled for the temperature, pH, specific conductance, and other field parameters. These field parameters are measured as described previously. All results are documented on the ESC Field Information Form.

The lysimeters monitored for depth to water information only are monitored as discussed above and information is recorded on the ESC Field Information Form.

5.5 Surface Water Monitoring

Staff gauge readings are recorded from the dedicated staff gauges located at each sample location. Readings are recorded to the 0.01-foot and surface water elevations are determined based on survey data.

5.6 Leachate Sample Collection and Monitoring

Leachate samples are collected from the leachate sump. The sampling system used consists of a dedicated bailer. The sampling nipple used with the bailer allows for samples to be dispensed at the lowest flow possible in order to provide high-quality, representative, and consistent data. Samples are placed in new pre-preserved containers provided by the laboratory. Leachate samples are not filtered.

A separate container is filled for the temperature, pH, specific conductance, and other field parameters. Field parameters are measured as described previously. The color, turbidity and odor of the sample are noted. All results are documented on the ESC Field Information Form.

Leachate head elevations are monitored at leachate head wells. Elevations are measured with a portable HDPE popper stick which signals by audio when the probe contacts the liquid. ESC uses a site dedicated popper stick for leachate levels. The liquid level measurement is recorded to the nearest 0.01 foot. The depth to liquid level indicator is decontaminated using deionized water between head wells.

5.7 Leachate Tank Interstitial Space Sample Collection

Leachate tank interstitial space samples are collected from the leachate tank interstitial space sump. The sampling system used consists of a dedicated electric submersible pump. Samples are collected at the lowest flow possible in order to provide high-quality, representative, and consistent data. Samples are placed in new pre-preserved containers provided by the laboratory. Leachate tank interstitial space samples are not filtered.

A separate container is filled for the specific conductance, and other field parameters. Field parameters are measured as described previously. The color, turbidity and odor of the sample are noted. All results are documented on the ESC Field Information Form.

5.8 Gas Condensate Sample Collection

Gas condensate samples are collected from the gas condensate manhole. The sampling system used consists of a dedicated sampling bucket. Samples are collected and containerized at the lowest flow possible in order to provide high-quality, representative, and consistent data. Samples are placed in new pre-preserved containers provided by the laboratory. Gas condensate samples are not filtered.

A separate container is filled for the pH, specific conductance, and other field parameters. The color, turbidity and odor of the sample are noted. All results are documented on the ESC Field Information Form.

5.9 Gas Blower Sample Collection and Gas Monitoring

Gas blower samples are collected from the positive pressure generated at the blower/flare station. Samples are collected in canisters or sample containers provided by the laboratory and are collected in accordance with any method specific procedures required for the specific analysis. Flow rate and gas quality are recorded before and after sample collection. Information is recorded on the ESC Gas Monitoring Field Form (Attachment 3).

6.0 Sample Shipment

Groundwater, water supply well, gradient control/underdrain discharge, lysimeter, surface water, leachate, interstitial space and gas condensate samples are placed on ice in coolers immediately after sample collection and maintained at a temperature of 4 °C. The signed laboratory Chain-of-Custody Forms will also be placed in this cooler. Sample coolers are delivered to the laboratory as soon as possible.

7.0 QA/QC Sampling Procedures

The following QA/QC samples are collected as part of the monitoring program:

- One temperature blank is included with each cooler;
- One field blank is collected for approximately every twenty samples collected;
- One duplicate sample is collected per day or approximately every twenty samples collected;
- One laboratory supplied trip blank is sent per day when ever volatile organic compounds (VOCs) are collected.

Temperature blanks are provided by the laboratory and included with each cooler. Temperature blanks ensure that samples are maintained at or below 4 °C upon arrival to the laboratory.

Field blank samples are prepared in the field at a routine sample collection point during a monitoring event by filling the pre-preserved sample containers with deionized water. The field blank is analyzed for contamination that may occur due to site ambient air conditions, sample containers, coolers, cleaning procedures, or preservatives.

A field duplicate is an extra set of samples collected at a random monitoring point and labeled as “DUP”. This is an additional sample collected from the same source, stored in separate containers, and analyzed independently. The samples shall be collected in proper alternating order for the sample point and field duplicate for each parameter (i.e., collect metals sample, then collect duplicate metals sample). Field duplicates are used to document the precision of the sampling and analytical process.

Laboratory VOC trip blanks are sent from the laboratory with the original bottle shipment and shall remain with the samples during sample collection and sample shipment. Trip blanks are analyzed for contamination that may occur due to sample shipment, sample preservatives, or exposure to contaminants after collection.

8.0 Chain-of-Custody Procedures

At the time each sample is collected, a laboratory Chain-of-Custody Form is completed and placed in the cooler. With the transfer of sample possession to a subsequent custodian, the Chain-of-Custody Form is signed by the person taking custody of the cooler. Upon receipt of the samples at the laboratory, the condition of the samples, date, time, cooler number, temperature, and seal number is recorded by the receiver. The Chain-of-Custody records are included in the analytical report prepared by the laboratory, and are consolidated as an integral part of that report.

As part of the Chain-Of-Custody procedure, each sample container is labeled with the sample ID number, bottle type and size, preservative, and filtering requirements.

All sampling procedures, measurements, and observations are to be recorded on the Field Information Forms and Chain-Of-Custody Forms as follows:

- Facility site number and name, sample point ID, sample date and time, and source codes
- Field-filtering and specific sample bottle comments
- Field measurements (i.e., depth to water, groundwater elevation and well depth)
- Purging information (i.e., date, start time, elapsed hours, water volume in casing and actual water volume purged)
- Field test results, including pH, temperature, and specific conductance, as required
- Field observations and weather conditions
- Appearance of sample (i.e., odor, color and turbidity)

The sampler's identification, laboratory custodian's identification (with signature), and the date and time of arrival is noted on the Chain-of-Custody Form. The laboratory custodian will verify that the cooler is intact and make notes of the sample bottle condition on the form. These forms are retained by the laboratory and returned with the results of the analyses.

Attachment 1

Advanced Disposal Services - Glacier Ridge Landfill Sampling Schedule and Map

ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
DODGE COUNTY, WI (WDNR LICENSE # 3068)
2018 MONITORING SYSTEM SUMMARY - rev. 04/18

GROUNDWATER				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Non-Subtitle D Detection Wells: A-3A#+, W-2R, MW-8R+, W-9RR, W-10R, W-152R, W-153, W-153A, W-154, W-155, W-159, W-159A, W-161R, W-164, W-164A, W-165, W-165A, W-166, MW-204A#+, MW-301, P-301A, P-302A, MW-304, P-306A, P-307A, MW-308, P-308A, MW-309#, P-309A#, MW-310, MW-428^, P-428A^ FB-01, DUP-01, DUP-02, Trip Blank (3) # - Until abandoned ^ - After installation + - Shared well- do not duplicate (35 sets)	field pH field conductivity field temperature field observations groundwater elevation (ft. MSL) chloride* hardness* alkalinity*	April	Semi-Annual (SCS)
II.	Non-Subtitle D Detection Wells: MW-1RR+, MW-1AR+, W-163+, W-163A+, MW-403, P-403A, P-406A, P-406B, DUP-03, Trip Blank (2) # - Until abandoned + - Shared well- do not duplicate (10 sets)	field pH field conductivity field temperature field observations groundwater elevation (ft. MSL) chloride* hardness* alkalinity* VOCs (8260) NR507, App. III	April & October	Semi-Annual (SCS)
III.	Subtitle D Wells: W-158, W-160R, MW-302, MW-306, MW-307, MW-406, DUP-04, Trip Blanks (2) (7 sets)	field pH field conductivity field temperature field observations groundwater elevation (ft. MSL) chloride* hardness* alkalinity* VOCs (8260) NR507, App. III	April & October	Semi-Annual (SCS)
IV.	Vertical Wells: W-7R, W-7AR, W-8, W-8A, W-38, MW-408#, P-408A# # - Until abandoned Horizontal Wells: GH-1, GH-2, GH-3, GH-4, GH-5, GH-6, GH-7	groundwater elevation (ft. MSL)	April & October	Semi-Annual (SCS)
V.	Non-Subtitle D Detection Wells: A-3A#+, W-2R, MW-8R+, W-9RR, W-10R, W-152R, W-153, W-153A, W-154, W-155, W-159, W-159A, W-161R, W-164, W-164A, W-165, W-165A, W-166, MW-204A#+, MW-301, P-301A, P-302A, MW-304, P-306A, P-307A, MW-308, P-308A, MW-309#, P-309A#, MW-310, MW-428^, P-428A^, FB-01, DUP-01, DUP-02, Trip Blank (3) # - Until abandoned ^ - After installation (35 sets)	field pH field conductivity field temperature field observations groundwater elevation (ft. MSL) chloride* hardness* alkalinity* VOCs (8260) NR507 App.III	October	Semi-Annual (SCS)

* - Field filtered

Wells that are shared between LGRL and ADS-GRL should have only one bottle set prepared for the two sites. The site name should be recorded as ADS-GRL/LGRL on the bottle labels. The wells do not need two sets of bottles collected.

**ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
DODGE COUNTY, WI (WDNR LICENSE # 3068)
2018 MONITORING SYSTEM SUMMARY - rev. 04/18**

PRIVATE WELLS				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Standing Committee Private Wells: as requested by homeowners (number and location of wells will vary each year) (Contact homeowner prior to collecting samples to set up date/time.)	field pH field conductivity field temperature field observations total coliform bacteria alkalinity COD chloride hardness lead** nitrate nitrogen VOCs (524.2)	As requested (required by Standing Committee)	Letters to Homeowners within 10 days of receipt of results (ESC)
II.	Plan of Ops Monitoring: PW-J, trip blank	field pH field conductivity field temperature field observations alkalinity hardness chloride VOCs (8260) NR507 App.III	April June 2018 (split)	Semi-Annual (SCS) Letters to Homeowners within 10 days of receipt of results (ESC)
III.	Plan of Ops Monitoring: PW-A, PW-AD, PW-H, PW-, PW-J, PW-K, PW-L, PW-N, PW-T, PW-U, PW-DUP, Trip Blanks (3) (PW-A, PW-H, PW-N - no homes on property; unable to sample) (8 sets)	field pH field conductivity field temperature field observations alkalinity hardness chloride VOCs (8260) NR507 App.III	October	Annual (SCS) Letters to Homeowners within 10 days of receipt of results (ESC)

Notes:

** - Lead sample is to be collected at the kitchen sink (separate bottle)

OFFICE/SHOP WELL (Safe Drinking Water - NN Water Supply Well)				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Office/Shop Well: (Breakroom Sink) (1 set)	field pH field conductivity field temperature field observations coliform bacteria	Quarterly (Jan, Apr, Jul, Oct)	Quarterly (Lab) Lab reports directly to WDNR (see note below)
II.	Office/Shop Well: (pressure tank - first floor) (1 set)	field pH field conductivity field temperature field observations nitrate	Annual (April) (must be collected prior to Sep.30th)	Annual (Lab) Lab reports directly to WDNR (see note below)

Notes:

Office/Shop Well data should be prepared as a separate lab report. Analytical data results should be submitted by the laboratory after the data has been reviewed by the Certified Water System Operator. NN water supply well monitoring requirements may change annually.

ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
DODGE COUNTY, WI (WDNR LICENSE # 3068)
2018 MONITORING SYSTEM SUMMARY - rev. 04/18

GRADIENT CONTROL SYSTEM / UNDERDRAIN				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Gradient Control Monitoring Headwell: GCM-1 Underdrain Monitoring: UDM-1, UDM-2^ ^ - After installation	groundwater elevation (ft. MSL)	April & October	Semi-Annual (SCS)
II.	Gradient Control Lift Station Discharge: GCL-1 (1 set)	field pH field conductivity field temperature field observations alkalinity hardness chloride	April & October	Semi-Annual (SCS)
III.	Underdrain Monitoring: UDL-1, UDG-1 (2 sets)	field pH field conductivity field temperature field observations alkalinity hardness chloride VOCs (8260) NR507 App.III	April & October	Semi-Annual (SCS)
IV.	Gradient Control Lift Station Discharge to Sed Basin: Outfall 1 (1 set)	field pH field conductivity field temperature field observations TSS ^ flow (gal/day) ^ ^ - required by WPDES DMR (7/11)	April & October	Annually WPDES only (Jan.31) (ESC)
V.	GW Control Trench (001) #, Underdrain (002), Landfill Perimeter Ditch (003), Temporary Construction (004), Trench Manhole + (5 sets) # - The GW Control Trench sample was previously called the Trench Outfall (Rip Rap). + - The Trench Manhole is not required by WPDES permit and may be discontinued at a later date.	field pH field conductivity field temperature field observations TSS ^ VOCs (8260) - (trichloroethene, 1,1-dichloroethene, and vinyl chloride) ^ flow (gal/day) ^ ^ - required by WPDES DMR (3/14)	April & October	Semi-Annual WPDES only (Jul-15, Jan-15) (ESC)

**ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
DODGE COUNTY, WI (WDNR LICENSE # 3068)
2018 MONITORING SYSTEM SUMMARY - rev. 04/18**

LEACHATE				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Leachate Tank (1 set)	field pH (1) field conductivity (2) field temperature (3) field observations (3) field turbidity (NTU) (3) depth to liquid (panel reading) (3) total phenols (3) - <i>ADS Request</i> alkalinity (2) hardness (2) volatile fatty acid (need breakdown) (2) ammonia nitrogen (1) COD (1) BOD (1) cadmium (4) chromium (4) (5) copper (4) (5) lead (4) nickel (4) (5) silver (4) zinc (4) (5) TSS (4) total phosphorus (4) (5) TKN (4) cyanides (4) oil & grease (hydrocarbons) (4) chloride (4) arsenic (5) molybdenum (5) selenium (5) (1) - required by WDNR and WWTP, (2) - required by WDNR only (3) - not required by WDNR or WWTP (4) - required by WWTP only (PW & Wauk), (5) - required by WWTP only (Fond Du Lac)	January & July	Semi-Annual (SCS) Quarterly WWTP reporting (ESC)
II.	Leachate Tank, Trip Blank (Collect Mon/Tues for lab sub-contract) (1 set)	field pH field conductivity field temperature + field observations + field turbidity (NTU) + depth to liquid (panel reading) + total phenols + COD BOD volatile fatty acid (need breakdown) TSS chloride alkalinity hardness sulfate TKN sodium iron ammonia nitrogen sulfide mercury cadmium lead manganese VOCs (8260) - NR507 App. III Acid Extractables (NR507 App.II) Base/Neutral Extractable Compounds PCBs (+ -not required by WDNR permit)	April & October	Semi-Annual (SCS) Quarterly WWTP reporting (ESC)

Notes: Use GC-Method for volatile fatty acids

ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
DODGE COUNTY, WI (WDNR LICENSE # 3068)
2018 MONITORING SYSTEM SUMMARY - rev. 04/18

LEACHATE (CONT.)

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
III.	Leachate Tank	field pH depth to liquid (panel reading) + field conductivity+ field observations+ field turbidity (NTU)+ (+ -not required by WDNR permit)	February, March, May, June, August, September, November, & December	Semi-Annual (ESC) submit w/LFG data in Feb/Aug

INTERSTITIAL SPACE

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Leachate Tank Interstitial Space	field pH+ field conductivity field observations field turbidity (NTU) depth to liquid+ groundwater elevation (ft. MSL) volume pumped+ (+ -not required by WDNR permit)	January, February, March, May, June, July, August, September, November, December	Semi-Annual (ESC) submit w/LFG data in Feb/Aug
II.	Leachate Tank Interstitial Space (1 set)	field pH+ field conductivity field observations field turbidity (NTU) depth to liquid+ groundwater elevation (ft. MSL) volume pumped+ (+ -not required by WDNR permit) BOD COD	April & October	Semi-Annual (SCS)
III.	Leachate Tank Interstitial Space	BOD COD	As needed (Collect sample if parameters in Task 1 are not consistent with historic data. Contact GM if sample collection is warranted.)	Annual (ESC) in Annual Report

LEACHATE HEADWELLS

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	LH-3 through LH-16, LH-21 through LH-26 (LH-17 to LH-20 and LH-27 to LH-30 after installation)	Leachate head elevation (ft.MSL) Leachate depth (ft.)	Monthly	Semi-Annual (ESC) submit w/LFG data in Feb/Aug

**ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
DODGE COUNTY, WI (WDNR LICENSE # 3068)
2018 MONITORING SYSTEM SUMMARY - rev. 04/18**

GAS CONDENSATE

[illegible]

GAS EXTRACTION SYSTEM

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Perimeter of collection area, all point penetrations, traverse pattern at 30 meter intervals, areas of concern/distressed areas (omit dangerous areas)	surface emissions	Quarterly (by March, June, September, and December)	Quarterly (ESC)
II.	GB-1 (Gas Blower Inlet)	VOCs (TO-14A or TO-15) Sulfur compounds (ASTM D-5504) Check with ADS for additional analyses	April	Annual (SCS)
III.	GB-1 (Gas Blower Inlet)	NMOC (Method 25C) - Tier 2 not required Fixed Gases (Method 3C)	Every 3-Yrs in April (April 2020, April 2023, April, 2026, etc.)	Annual (SCS)

Notes:	Gas sample for VOC analysis should be collected in a 6L can backfilled with helium. Sample for sulfur compound analysis is collected in a Flex Foil bag and shipped in a paint can shipping kit. Field Kwik-draw readings for hydrogen sulfide should be recorded during each sulfur compound sampling event.
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LYSIMETER

[illegible]

**ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
DODGE COUNTY, WI (WDNR LICENSE # 3068)
2018 MONITORING SYSTEM SUMMARY - rev. 04/18**

LYSIMETER (CONT.)

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
III.	LS1, LS2, LS3, LS4, LS5, LS6, LS7, Trip Blank (1) (7 sets)	field pH field conductivity field temperature field observations VOCs (8260) - NR507 App.III alkalinity hardness chloride sulfate COD sodium TKN	October	Semi-Annual (SCS)

Note: When limited sample volumes can be obtained from the lysimeters, analyses will be performed in the order listed above. VOCs take precedence in October.

SURFACE WATER

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	SW-8, SW-9, SW-10, SW-11, SW-12, SW-14, SW-15, SW-19, SW-20, SW-21, SW-22	surface water elevation (ft. MSL)	April & October	Semi-Annual (SCS)

WEATHER STATION

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Weather Station (after installation)	download data files from computer, save to hard drive	January, April, July, October	None

BIOPILE - TO BE PERFORMED BY ON-SITE PERSONNEL

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Ambient air upwind and downwind	VOCs	Monthly	Annual (ESC) In BP Annual Rpt.
II.	Vacuum header line prior to blower	VOCs % O2 %CH4	Monthly	Annual (ESC) In BP Annual Rpt.
III.	Post Treatment Sample Collection	GRO DRO VOCs	As Needed	Annual (ESC) In BP Annual Rpt.

GAS SYSTEM MONITORING - TO BE PERFORMED BY ON-SITE PERSONNEL

TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Gas Condensate Dripleg Pump Discharge (Blower building inlet condensate tank discharge)	Gas condensate volume pumped	Monthly	Semi-Annual (SCS)
II.	Gas extraction wells, Supplemental gas extraction points (per air permit)	%CH4 %O2 %CO2 %Bal. gas gas flow rate gas temperature valve (%open) wellhead pressure header pressure	Monthly	Semi-Annual (ESC) submit w/LFG data in Feb/Aug
III.	Vertical gas extraction wells	leachate depth leachate elevation (ft. MSL)	Annual (June)	Semi-Annual (ESC) submit w/LFG data in Feb/Aug

**ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
DODGE COUNTY, WI (WDNR LICENSE # 3068)
2018 MONITORING SYSTEM SUMMARY - rev. 04/18**

GAS SYSTEM MONITORING - TO BE PERFORMED BY ON-SITE PERSONNEL (CONT.)				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
IV.	Blower Inlet (includes flow from N, S, and SE Exp.) (formerly GB-1)	%CH ₄ %O ₂ %CO ₂ %Bal. Gas gas flow rate (cfm) gas volume extracted header pressure gas temperature	Monthly	Semi-Annual (ESC) submit w/LFG data in Feb/Aug
V.	South and Southeast Expansion Total Flow	gas flow rate (cfm)	Monthly	Semi-Annual (ESC) submit w/LFG data in Feb/Aug

GAS SYSTEM MONITORING - TO BE PERFORMED BY ON-SITE PERSONNEL (CONT.)				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
VI.	Site Conditions	ambient air temp barometric pressure pressure trend ground conditions (1=frozen, 2=wet, 3=dry)	Monthly	Semi-Annual (ESC) submit w/LFG data in Feb/Aug
VII.	Gas probes	%CH ₄ %O ₂ barometric pressure pressure trend ambient air temperature	January, April, July, & October	Semi-Annual (ESC) submit w/LFG data in Feb/Aug

LEACHATE MONITORING - TO BE PERFORMED BY ON-SITE PERSONNEL				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Leachate Tank	Leachate volume pumped Leachate volume recirculated	Monthly	Semi-Annual (ESC) submit w/LFG data in Feb/Aug
II.	Dual Containment Pipe	presence of liquid	Monthly (Not required by WDNR permit)	Annual (ESC) in Annual Report
III.	LV-1 through LV-5 (LV-6 - LV-18 after construction)	Leachate volume pumped	Monthly	Semi-Annual (ESC) submit w/LFG data in Feb/Aug

SURFACE WATER MONITORING - TO BE PERFORMED BY ON-SITE PERSONNEL				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	SB-1 through SB-5 (SB-6 after construction)	Visual observations of color, odor, turbidity, floating solids, foam, and oil sheen (WPDES Tier 2 Permit)	Quarterly during storm event	Annual (ESC) in Annual Report

GRADIENT CONTROL SYSTEM / UNDERDRAIN - TO BE PERFORMED BY ON-SITE PERSONNEL				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Gradient Control Lift Station Discharge: GCL-1 Underdrain Discharge: UDL-1, UDG-1	Groundwater Volume Pumped	Monthly	Semi-Annual (ESC) submit w/LFG data in Feb/Aug

**ADVANCED DISPOSAL SERVICES GLACIER RIDGE LANDFILL
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SURFACE ELEVATION CHANGES - TO BE PERFORMED BY ON-SITE PERSONNEL				
TASK	MONITORING POINTS	PARAMETERS	FREQUENCY	REPORTING
I.	Closed Glacier Ridge Landfill Elevation Hubs South and Southeast Expansion Points at 100-ft intervals along transect lines at 3500 E, 4000 E, 4500 E, 5000E Monitor only transect points with final cover (Point IDs to be assigned)	Ground surface elevation (ft. MSL)	October (Annual until 5 years after closure; then every 5 years)	Annual Rpt (ESC)

Source: City of Waukesha Industrial Wastewater Discharge Permit, 2015
Organic Stability Project Summary Approval, dated May 4, 2007
Conditional Approval - General WPDES Permit for Pit/Trench Dewatering, dated February 9, 2006; R.Liska memo dated May 10, 2011 and revised DMR forms issued on July 15, 2011.
Coverage under General Permit WI-0046566-06, Discharge of Contaminated Groundwater from Remedial Action Operations, dated March 3, 2014.
Plan of Operations Approval for Onyx Glacier Ridge Landfill South Expansion, dated September 2005
Leachate Recirculation Plan of Operations Approval Modification, dated August 3, 2001.
2018 Drinking Water System Monitoring Requirements for Advanced Disposal Glacier Ridge Landfill Office/Shop
Glacier Ridge Landfill Southeast Expansion Plan of Operation, dated October 2013

Contacts: Jake Margelofsky- ADS-GRL: 920-210-3911 (cell)
Ryan Daniels - ADS-GRL: 608-381-6038
Cindy Varga - Pace Analytical: 920-321-9455
Sherren Clark - SCS Engineers: 800-676-5038
GRL Office: 920-387-0949

Reporting: Laboratory analytical data (including gas blower lab data) to be submitted to the WDNR by SCS.
Landfill gas monitoring and leachate/lysimeter volumes to be reported semi-annually (Feb and Aug) by ESC.
Semi-annual APC Reports and Annual Compliance Report to be reported semi-annually (Feb and Aug) by ESC.
Annual Report to be prepared by ESC and submitted to the WDNR by April 30.
Leachate recirculation data to be included in Annual Report (SCS provides Technical Memos for RD&D and Org.Stab.).
Private well data for office well submitted to WDNR quarterly by lab. ESC review as DW Operator prior to submitting.
Letters and data for private wells (SW permit and Standing Committee programs) sent to homeowners and ADS-GRL by ESC.
WPDES reporting to WDNR for GW Control Trench semi-annually (Jan 15th and Jul 15th) and for Outfall 1 annually (Jan 31st).
Report immediately if there are any exceedances during the semi-annual monitoring events or construction samples.
Surface Emissions Monitoring reports - March, May, August, November

Attachment 2

ESC Field Information Form

MONTH: 2018

MONTH:

2018

CP263/ESC/Forms/Field Form.xls

Attachment 3

ESC Gas Monitoring Field Form

**Environmental Sampling Corporation
Gas Sampling Field Form**

Site: _____
Date: _____

Weather Conditions:

Temp (deg.F)	Wind Speed (mph)	Direction	Bar. Pres.	Trend
Description:				

Gas Instrument:

Type	Serial No.

Sample Location: _____

Gas Quality:

Time	%CH ₄	%CO ₂	%O ₂	%Bal	Gas Temp (deg.F)	Static Pres. (in.H ₂ O)	Flow (scfm)	Flare Temp (deg.F)
(I)								
(F)								

Systems Operating (List):

Gas Analyses / Laboratory (List):

Notes:

Environmental Sampling Corporation
Gas Sampling Field Equipment List:

Equipment Required:

- ☐ Gas meter
- ☐ Tubing, fitting, sample ports, and attachments
- ☐ Adjustable wrench
- ☐ Personal Safety Gear (i.e. vest, glasses, hard hat)
- ☐ Sampling Media (see below):

Jet-Care Siloxane:	Jet-Care SiTest Kit Sample bottles Extension cord Intrinsically safe connection
Net Heating Value (BTU):	Tedlar / Zefron bag (1L)
Sulfur Compounds:	Tedlar / Zefron bag / Flexfoil(1L)
Organic Sulfur:	Tedlar / Zefron bag (1L)
VOCs (TO-15):	1L / 6L canister
Method 3C:	1L / 6L canister or Tedlar bag (1L)
Method 25C:	1L / 6L canister
Tier II Calcs:	(3) 6L canisters (triplicate sample)

Turnaround Times / Shipping Information:

Analysis:	Hold Time:	Shipping Method:
Jet-Care Siloxane	NA	Standard Overnight
Net Heating Value (BTU)	24 hr.	Priority Overnight
Sulfur Compounds	24 hr.	Priority Overnight / First Overnight
Organic Sulfur:	48 hr.	Standard Overnight
VOCs (TO-15):	NA	Standard Overnight
Method 3C:	NA	Standard Overnight
Method 25C:	NA	Standard Overnight
Tier II Calcs:	NA	Standard Overnight